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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/624,408	07/21/2003	Chet R. Douglas	P16578	6803

7590 07/12/2005
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EXAMINER

SORRELL, ERON J

ART UNIT	PAPER NUMBER
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2182

DATE MAILED: 07/12/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/624,408

Applicant(s)

DOUGLAS, CHET R.

Examiner

Eron J. Sorrell

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-27 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 7/21/03 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: ____.

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DETAILED ACTION

Claim Rejections - 35 USC § 101

1. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 18-27 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Claims 18-27 are not limited to tangible embodiments. In view of the applicant's disclosure, specification page 8, lines 1-21, the article of manufacture is not limited to tangible embodiments, instead being defined as including both tangible embodiments (e.g., integrated circuit chip, magnetic storage media, optical storage, etc.) and intangible embodiments (e.g., signals propagating through space, radio waves, infrared signals, etc.) As such, the claim is not limited to statutory subject matter and is therefore non-statutory. Applicant should amend the specification such that the article of manufacture is limited to tangible embodiments only.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

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A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1,10,11,17,18, and 27 are rejected under 35

U.S.C. 102(b) as being anticipated by Foster (U.S. Patent No. 5,948,081).

Referring to method claim 1, system claim 11, and article of manufacture claim 18, Foster teaches a system for managing requests to a storage device, wherein a storage controller manages access to the storage device, comprising:

a processor (see item labeled 12 in figure 1);

a memory device accessible to the processor (see item labeled 42 in figure 2 and lines 41-53 of column 5); and

a device driver executed by the processor, wherein the device driver when executed causes operations to be performed, the operations comprising:

(i) queue I/O requests directed to the storage device in the memory device (see lines 41-53 of column 5);

(ii) determine whether a number of queued I/O requests exceeds a threshold (see lines 25-41 of column 7);

(iii) if the number of queued I/O requests exceeds the threshold then calculating a coalesce limit (see lines 25-41 of

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column 7, wherein Foster teaches bursting data when an "almost full" condition is met, and paragraph bridging columns 9 and 10, wherein Foster teaches determining how much data can be burst transferred);

(iv) coalescing a number of queued I/O requests not exceeding the calculated coalesce limit into a coalesced I/O request (see paragraph bridging columns 9 and 10); and

(v) transmitting the coalesced I/O request (see paragraph bridging columns 9 and 10).

4. Referring to method claim 10, system claim 17, and article of manufacture claim 27, Foster teaches transmitting one I/O request from the queue if the number of queue I/O requests does not exceed the threshold (see lines 25-35 of column 9).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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6. Claims 2,3,5-9,12,13,15,16,19,20, and 22-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Foster in view of Myers (U.S. Patent No. 6,877,049).

7. Referring to method claim 2, system claim 12, and article of manufacture claim 19, Foster fails to teach the limitation of the calculated coalesce limit dynamically varies based in part on the number of queued I/O requests.

Myers teaches, in an analogous system, the above limitation (see lines 48-65 of column 5).

It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the system and method of Foster with the above teachings of Myers. One of ordinary skill in the art would have been motivated to make such modification in order to account for all pending requests that are still in process within the memory as suggested by Myers (See lines 60-65 of column 5).

8. Referring to method claim 3, system claim 13, and article of manufacture claim 20, Myers teaches calculating the coalesce limit includes dividing the number of queued I/O requests by an interval (see lines 12-20 of column 6).

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It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the system and method of Foster with the above teachings of Myers. One of ordinary skill in the art would have been motivated to make such modification in order to tune the buffer according to usage.

9. Referring to method claims 5-8, system claim 15, and article of manufacture claims 22-25, Myers teaches the system further comprises a first queue in the memory device (storage device) (see lines 40-51 of column 1), wherein the storage controller includes a second queue (see paragraph bridging columns 4 and 5), wherein determining whether the number of queued I/O requests exceeds the threshold comprises determining whether a number of I/O requests in the second queue exceeds the threshold, and wherein coalescing the number of queued I/O requests comprises coalescing I/O requests from the first queue, and transmitting the coalesced I/O request to the second queue (see paragraph bridging columns 9 and 10, note the client can read from and write to the memory device).

It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the system and method of Foster with the above teachings of Myers.

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One of ordinary skill in the art would have been motivated to make such modification maximize the overall number of data obtained in the data request bursts without overflowing the FIFO buffer and possibly losing data as suggested by Myers (see lines 51-56 of column 2).

10. Referring to method claim 9, system claim 16, and article of manufacture claim 26, Myers teaches determining whether there are at least two I/O requests in the first queue after determining that the number of requests in the second queue exceeds the first queue, wherein I/O requests from the first queue are only coalesced if there are at least two I/O requests in the first queue (see paragraph bridging columns 9 and 10, note Myers teaches keeping a count of the data blocks in the FIFO and the data blocks can only be coalesced if there are at least two data blocks).

It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the system and method of Foster with the above teachings of Myers. One of ordinary skill in the art would have been motivated to make such modification maximize the overall number of data obtained in the data request bursts without overflowing the FIFO

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buffer and possibly losing data as suggested by Myers (see lines 51-56 of column 2).

11. Claims 4, 14, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Foster in view of Gunlock et al. (U.S. Patent No. 5,522,054 hereinafter "Gunlock").

12. Referring to method claim 4, system claim 14, and article of manufacture claim 21, Foster teaches coalescing the queued I/O requests comprises determining a maximum number of queued I/O requests up to the coalesce limit that are directed to data stored at sequential locations, wherein the determined I/O requests are coalesced into the coalesced I/O request. Foster fails to teach the limitation of all the coalesced I/O requests are directed to data stored at sequential locations.

Gunlock teaches, in an analogous system, the above limitation (see lines 40-60 of column 2).

It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the system and method of Foster with the above teachings of Gunlock. One of ordinary skill in the art would have been motivated to make such modification in order to improve disk drive

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performance as suggested by Gunlock (see paragraph bridging columns 2 and 3).

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following reference is cited to further show the state of the art as it pertains to queuing requests in a FIFO with a threshold level:

US Pub. No. 2004/0143687 to Cox teaches a method and system wherein I/O requests are buffered in a FIFO and further teaches a threshold level associated with the FIFO.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eron J. Sorrell whose telephone number is 571 272-4160. The examiner can normally be reached on Monday-Friday 9:00AM - 5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dov Popovici can be reached on 571-272-4083. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

EJS
July 6, 2005



KIM HUYNH
PRIMARY EXAMINER
2/7/05